

**Table 13.1. Overnight Capital Cost Characteristics for Renewable Energy Generating Technologies in Three Cases (2007\$/kW)**

Technology	Year	Reference	High Cost Renewable <sup>1</sup>	Low Cost Renewable
Geothermal <sup>2</sup>	2012	4,097	4,158	4,081
	2020	3,770	4,100	3,468
	2030	3,548	4,238	3,184
Hydroelectric <sup>2</sup>	2012	2,232	2,242	2,201
	2020	2,113	2,224	1,950
	2030	1,920	2,339	929
Landfill Gas	2012	2,532	2,543	2,370
	2020	2,348	2,543	2,025
	2030	2,043	2,543	1,592
Photovoltaic <sup>3</sup>	2012	5,266	5,434	4,937
	2020	4,513	5,434	3,946
	2030	3,440	5,434	2,705
Solar Thermal <sup>3</sup>	2012	3,407	3,515	3,180
	2020	3,597	4,519	3,228
	2030	2,774	4,519	3,152
Biomass <sup>4</sup>	2012	3,710	3,729	3,252
	2020	3,285	3,586	2,613
	2030	2,488	3,367	1,814
Offshore Wind	2012	3,784	3,851	3,462
	2020	3,412	3,851	2,872
	2030	2,859	3,851	2,134
Onshore Wind	2012	1,915	1,923	1,793
	2020	1,810	1,923	1,53
	2030	1,615	1,923	1,214

<sup>1</sup>Overnight capital cost (that is, excluding interest charges), plus contingency, learning, and technological optimism factors, excluding regional multipliers. A contingency allowance is defined by the American Association of Cost Engineers as the specific provision for unforeseeable elements of costs within a defined project scope. This is particularly important where previous experience has shown that unforeseeable events which will increase costs are likely to occur.

<sup>2</sup>Geothermal and Hydroelectric costs are specific for each site. The table entries represent the least cost unit available in the specified year in the Northwest Power Pool region. In the 2006 Renewables cases, costs vary as different sites continue to be developed.

<sup>3</sup>Costs decline slightly in the Low Renewable case for photovoltaic and solar thermal technologies as technological optimism is factored into initial costs (see pg. 72 in the chapter discussing the EMM). However, there is no learning-by-doing assumed once the optimism factor has been removed.

<sup>4</sup>Biomass plants share significant components with similar coal-fired plants, these components continue to decline in cost in the Low Renewables case, although biomass-specific components (especially fuel handling components) do not see cost declines beyond 2005.

Source: AEO2009 National Energy Modeling System runs AEO2009.D120908A, HIRENCST09.D011309B, and LORENCST09.D011509B.